

APPLICATION FOR UNITED STATES LETTERS PATENT

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TITLE:

METHOD OF AND APPARATUS FOR MANI-
PULATING COUPONS AND THE LIKE IN
CIGARETTE PACKING MACHINES

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CROSS-REFERENCE TO RELATED CASES

This application claims the priority of copending German patent application Serial No. 100 56 403.8 filed November 14, 2000. The disclosure of the above-refer-
5 enced German patent application, as well as that of each US and foreign patent and patent application identified in the specification of the present application, is incorporated herein by reference.

BACKGROUND OF THE INVENTION

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The invention relates to improvements in methods
of and in apparatus or machines for making packs which
contain arrays of plain or filter cigarettes, cigars,
5 cigarillos or other smokers' products. More parti-
cularly, the invention relates to improvements in methods
of and in apparatus for providing such commodities with
inserts in the form of sheet-like blanks or coupons made
of paper or the like and carrying information such as
10 advertising or promotional matter, instructions, warnings
and/or the like.

As a rule, a conventional method of the above
outlined character includes the steps of withdrawing
successive sheet-like blanks or coupons from a source
15 of supply and delivering the thus withdrawn blanks or
coupons (hereinafter called blanks for short) to a
position beneath successive stiffening collars which are
to form part of so-called hinged lid packs. Known
apparatus for the practice of such method include a
20 device which withdraws successive blanks from a storage
facility and a device which transports the thus withdrawn
blanks to a predetermined first position for assembly
directly with a cigarette pack or the like. Reference
may be had, for example, to German patent No. 196 41 605
25 C2 to Furmanski et al. A drawback of the method and ap-

paratus disclosed in this patent is that the blanks can be delivered only onto cigarette packs or analogous commodities rather than to proper positions relative to the collars. In addition, the patented apparatus is complex,
5 bulky and expensive.

US patent No. 5,657,609 (granted August 19, 1997 to Spada et al.) discloses an apparatus wherein a belt conveyor delivers successive coupons of a series of coupons into the range of a pusher which assembles
10 successive coupons with discrete collars extending into the peripheral pockets of an indexible turntable. The latter delivers successive collar-coupon combinations to a station where cigarette packs are admitted into the pockets in such a way that each coupon is located between
15 a pack and a collar. The thus obtained pack-coupon-collar combinations are thereupon transferred onto a further indexible turret which cooperates with means for at least partially completing the confinement of the pack, coupon and collar in an outer envelope. The pa-
20 tented apparatus lacks any means for reliably guiding the coupons on their way to the station where such coupons are brought in contact with discrete collars.

US patent No. 5,782,736 (granted July 21, 1998 to Brizzi et al.) proposes to directly connect each collar
25 to a coupon independently of external retaining means.

US patent No. 5,163,268 (granted November 17, 1992 to Vaccari et al.) proposes to deposit successive coupons on successive collars while the collars advance toward contact with discrete cigarette packs having arrays of cigarettes confined in inner envelopes of tinfoil. This patent does not propose the provision of any specific devices which should ensure predictable positioning of coupons relative to the respective collars.

US patent No. 5,146,728 proposes to feed discrete coupons onto discrete collars by a pair of rollers. Since the coupons are optional, this patent does not contain the description and/or illustration of any means for positioning successive collars and the associated coupons in a predetermined manner and/or with a high or reasonably high degree of predictability.

US patent No. 4,741,145 (granted May 3, 1988 to Bright et al.) proposes to assemble successive coupons with discrete packs and to thereupon push collars (called inner frames) onto the coupons.

OBJECTS OF THE INVENTION

5 An object of the present invention is to provide a novel and improved method of assembling, delivering and properly positioning blanks of paper or the like in packing machines for smokers' products.

Another object of the invention is to provide a method which renders it possible to position portions of or entire blanks below the component parts of the outer envelopes of cigarette packs and the like.

10 A further object of the instant invention is to provide a novel and improved apparatus for the practice of the above outlined method.

15 An additional object of the invention is to provide an apparatus which comprises a relatively small number of rather simple and compact parts.

20 Still another object of the invention is to provide a method which renders it possible to introduce blanks to positions at least partly beneath cigarette packs or analogous commodities with a high degree of accuracy and reproducibility.

25 A further object of the invention is to provide a method and an apparatus which render it possible to introduce portions of or the entire blanks to optimum positions without making it necessary to first lift the packs or arrays of packs in a cigarette packing machine

or the like.

Another object of the invention is to provide an apparatus which can treat the blanks and other parts of packaged smokers' products gently.

5 An additional object of the invention is to provide a novel and improved operative connection between the magazine and the folding device for blanks in a cigarette packing machine or the like.

10 Still another object of the invention is to synchronize the movements of various constituents of the above outlined apparatus to thus enable such constituents to cooperate in a time-saving manner.

15 A further object of the invention is to provide an apparatus which can reliably hold certain components of a cigarette packing machine or an analogous machine in optimum positions and which can ensure that, once moved to requisite positions, such components need not be reset or otherwise relocated (such as lifted) for the purpose of permitting movements of blanks to their
20 required or optimum positions.

SUMMARY OF THE INVENTION

One feature of the present invention resides in the provision of a method of manipulating blanks (such as sheet-like coupons bearing advertising and/or promotional material) in a machine for packing plain or filter cigarettes or other smokers' products wherein the blanks are stored in a magazine and are associated with collars at an assembling station prior to confinement in outer envelopes (e.g., in outer envelopes of lightweight cardboard) jointly with packs of smokers' products. The method comprises the steps of transporting successive collars of a series of collars from a source of collars to the assembling station, and conveying successive blanks from the magazine, along a predetermined path, and on to the assembling station so that each blank reaches the station while a collar is at a standstill at the station. The conveying step includes or is associated with the step of positively guiding each blank at least along a portion of the path, e.g., along the entire path or along the major portion of such path.

The method can further comprise the steps of delivering to the assembling station a series of successive packs, positioning each pack at the assembling station in a manner such that at least a portion of a blank at the assembling station is disposed between the

pack and a collar, and jointly evacuating the pack, the blank and the respective collar from the assembling station. Such method can further comprise the step of terminating the step of positively guiding upon completed delivery of each of the series of successive packs at the assembling station. The terminating step can include or involve the application of pressure to the blank at the assembling station.

The aforementioned evacuating step can include terminating the step of positively guiding a blank upon completed delivery of each of the series of successive packs to the assembling station. Such evacuating step can further include introducing each pack, together with a blank and a collar, into a pocket of an indexible packing conveyor at the assembling station.

Each conveying step can include conveying a blank to a position beneath the collar at the assembling station.

The guiding step can include simultaneously guiding several portions of a blank in the aforementioned portion of the path; for example, the arrangement can be such that each blank is guided along two of its edge faces and/or along narrow portions of surfaces adjacent such edge faces.

Another feature of the present invention resides

in the provision of an apparatus for manipulating blanks
(such as coupons) in a machine for packing smokers'
products wherein the blanks are stored in a magazine and
are associated with collars at an assembling station
5 prior to confinement in an outer envelope jointly with
packs of smokers' products. The improved apparatus
comprises means for transporting successive collars of
a series of collars from a source of collars to the assem-
bling station, means for temporarily maintaining each
10 collar at the assembling station in a predetermined
position, means for conveying a succession of blanks from
the magazine, along a predetermined path and on to the
assembling station so that each blank reaches the station
while a collar is at a standstill at the station and
15 assumes the predetermined position, and guide means for
positively guiding each blank at least along a portion
of the aforementioned path.

The arrangement is or can be such that a collar
dwelling at the assembling station in its predetermined
20 position is located at least in part at a level above
a blank at such station.

The means for temporarily maintaining each collar
at the assembling station in a predetermined position
can include a device (such as an indexible turret) having
25 at least one pocket located beneath the blank at the as-

sembling station. The guide means is or can be arranged to releasably hold a blank at the assembling station against unintentional entry into the pocket. Such apparatus can further include means for moving a blank at the assembling station from the guide means into the at least one pocket of the aforementioned device, and means for delivering packs into the at least one pocket at or close to the station. The moving means is or can be arranged to push a blank at the assembling station from the guide means toward the pack at the at least one pocket or at a location spaced apart from the assembling station.

The guide means (or at least that component part of the guide means which is adjacent the assembling station) is or can be spaced apart from the collar which occupies the predetermined position at such station.

The means for conveying the blanks from the magazine to the assembling station can include at least one indexible wheel and at least one suction head borne by the at least one wheel. Such apparatus can further comprise suitable means for separating blanks from the at least one suction head not later than at the assembling station.

The novel features which are considered as characteristic of the invention are set forth in particular in the appended claims. The improved apparatus itself,

however, both as to its construction and the modes of assembling, installing and operating the same, together with numerous additional important and advantageous features and attributes thereof, will be best understood upon perusal of the following detailed description of certain presently preferred specific embodiments with reference to the accompanying drawing.

5

BRIEF DESCRIPTION OF THE DRAWING

Fig. 1 is a fragmentary elevational view of a portion of a cigarette packing machine which embodies one presently preferred form of the invention, the means for transferring successive lowermost blanks from a source to requisite positions relative to successive collars being shown in a first position by solid lines and in a second position by broken lines;

Fig. 2 shows a detail in the apparatus of Fig. 1, with a blank in an intermediate position between the source and a collar;

Fig. 3 is a plan view of the structure which is shown in Fig. 2;

Fig. 4 is an elevational view similar to that of Fig. 2 but showing a blank in a further position nearer to its final position relative to the collar;

Fig. 5 is a plan view of the structure and of the blank shown in Fig. 4; and

Fig. 6 is a schematic transverse sectional view of a guide for successive blanks and a fragmentary schematic elevational view of a member which serves to expel the blank from the guide.

DESCRIPTION OF PREFERRED EMBODIMENTS

5 The apparatus which is shown in Fig. 1 comprises a storage facility 10 here shown as a magazine which contains a supply (stack) 13 of superimposed blanks 11 each of which can constitute a coupon carrying an advertisement, promotional material or the like. The purpose of the apparatus is to transfer successive blanks 11 from the outlet at the lower end of the magazine 10 into the range of a collar 19 which is to form part of a finished hinged lid pack containing an array of smokers' products. It is customary to bring successive blanks 11 into contact with the inner envelopes of packs P each of which contains an array of smokers' products (e.g., an array of plain or filter cigarettes, cigars or cigarillos in a so-called quincunx formation). The inner envelope can consist of metallic foil which directly surrounds and confines the array. The manner in which a blank can be positioned in a finished hinged lid cigarette pack having inner and outer envelopes is shown, for example, in 10 Figure 1 of the aforementioned US patent No. 5,657,609 to Spada et al.

15 A properly transferred blank 11 comes to rest beneath the collar 19 at a pocket 18 of a folding device 17 (e.g., a turntable or an analogous packing conveyor). 20 The means for conveying successive blanks 11 from the 25

magazine 10 to the collar 19 at an assembling station AS comprises suction heads or suction cups 12 at least one first of which is mounted on a pivotable or turnable carrier or arm 14 and at least one second of which is provided on an indexible suction wheel 16. In the positions which are shown in Fig. 1, the two suction heads 12 attract the lowermost blank 11 in the magazine 10 from below preparatory to conveying in the direction of arrow 23, namely away from the magazine and to a position (at the station AS) in which the freshly withdrawn blank is at least partially overlapped by the collar 19 and overlies the pocket 18 of the folding device (packing conveyor) 17.

The carrier 14 is pivotable about the axis of a horizontal shaft 15. This carrier must overcome a certain resistance which is offered by the lowermost blank 11 to its extraction from the magazine 10; to this end, the outlet of the magazine is preferably provided with suitable retaining means, e.g., in the form of metallic or plastic or elastic strips (not shown in Fig. 1) which underlie two or more marginal portions of the lowermost blank 11 in the magazine but permit extraction of such blank by the two suction heads 12 which are illustrated in Fig. 1.

The suction wheel 16 is turnable in and counter

to the direction indicated by the arrow 22 and its suction head 12 is spaced apart from the suction head 12 on the carrier 14. Once the lowermost blank 11 is withdrawn from the magazine 10, the right-hand suction head(s) is or are sealed from a suitable suction generating device (e.g., the suction intake of a blower, not shown) so that the next stage of conveying of such blank is carried out solely by the suction head(s) 12 borne by the suction wheel 16. At such time, the suction wheel 16 turns in a counterclockwise direction (as indicated by the arrow 22) and advances the blank 11 along an arcuate path toward and at least partially beneath the collar 19 at the assembling station AS. On its way with the suction head(s) 12 of the suction wheel 16, the blank 11 is caused to advance along a stationary arcuate guide 26 (Fig. 2) and into the range of an entraining member 20. The latter engages the delivered blank 11 as soon as the suction head(s) 12 of the suction wheel 16 releases or release the blank. Separation of the blank 11 from the suction head(s) 12 of the wheel 16 is effected by a separating device 24 which strips the blank off the suction wheel and its suction head(s).

The entraining member 20 pushes the freshly released blank 11 further in the direction of the arrow 22 until the blank reaches the desired or required or

prescribed position with reference to the collar 19. The entraining member 20 shares the angular movements of the suction wheel 16 and includes a projection 20a which engages and entrains the adjacent edge face of the blank 11 that is on its way toward the position in which it overlies the pocket 18 of the folding device 17 beneath the collar 19.

The means for transporting successive collars 19 from a source 119 to the assembling station AS comprises a conveyor which is denoted by the arrow 219. Such conveyor can deliver successive collars 19 directly to the station AS or onto the folding device (packing conveyor) 17 at a location ahead of such station; the device 17 is thereupon indexed once or more than once in order to advance the collar 19 to and to support the collar at the station AS. The collar at this station is or can be at a standstill when an oncoming blank 11 reaches its prescribed position relative to the pocket 18 which is shown in Fig. 1.

The means for positively guiding successive blanks 11 in their path from the outlet of the magazine 10 to the assembling station AS further comprises a second guide 21 which directs each of the blanks to a requisite position relative to the collar 19 then occupying such station. The guides 26 and 21 can positively guide each

blank 11 during each or practically each stage or during
a major (substantial) stage of conveying the blank from
the magazine 10 to the station AS. This folding device
17 holds the collar 19 at the station AS (either alone
5 or in conjunction with one or more additional parts) in
a predetermined position at least during the last stage
of conveying a blank 11 to this station.

In Fig. 2, the suction wheel 16 and its suction
head 12 (or one of its suction heads) are shown only sche-
10 matically. A blank 11 is shown in the process of moving
through an intermediate position in which its leader has
just entered the guide 21. The major part of this blank
is still adjacent the concave inner side of the arcuate
guide 26. The blank is still in the process of moving
15 forwardly (i.e., in the direction indicated by the arrow
22) by the suction head(s) 12 of the suction wheel 16.
The reference character 25 denotes the downstream or
discharge end of the guide 21.

Fig. 3 shows the structure of Fig. 2 in a plan
20 view. The guide 21 is designed to engage and guide the
two lateral edge portions and the two lateral marginal
portions of the blank 11 which is being advanced toward
and beneath the collar 19. Thus, the blank 11 is posi-
tively guided along the edge faces as well as from above
25 and from below adjacent such edge faces. In a plan view,

i.e., in the view of Fig. 3, the collar 19 has a substantially U-shaped outline. The character 16 denotes only the position of the suction wheel which is omitted in order not to conceal the parts beneath it; this suction wheel is assumed to carry a single suction head 12 which has an oval outline.

Fig. 4 shows a further stage of advancement of a blank 11 to its final position above the pocket 18 of the folding device 17. The collar 19 is shown partly broken away to reveal the entire blank 11. The entraining member 20 is in the process of advancing the blank 11 by pushing its trailing edge face. The inlet of the guide 21 is widened to facilitate entry of the leader of the blank 11.

Fig. 5 is a view similar to that of Fig. 3 but with the mobile parts of the apparatus in the positions corresponding to those shown in Fig. 4. The entraining member 20 comprises two parts; this is shown in Fig. 5.

Fig. 6 is a schematic transverse sectional view of the guide 21 with a blank 11 therein. This guide is open from above as well as from below. The magnitude of the opening in the bottom part of the guide 21 is such that this bottom part can still adequately support a blank 11 in the guide, i.e., that it is necessary to

exert a certain force in order to expel a blank from this guide. Such force is furnished by a reciprocable moving device 27, e.g., a pusher or plunger which can expel the blank 11 from the guide 21 in a downward direction (as indicated by the arrow 28) so that the blank enters the pocket 18 of the folding device 17.

When the improved apparatus is put to use in a cigarette packing machine or in an analogous machine, a collar 19 which is to form part of the ultimate product (hinged lid pack) is moved (see the arrow 219 in Fig. 1) to a predetermined position relative to the rotary blank folding turntable (packing conveyor or folding device) 17. The latter is thereupon indexed through a predetermined angle (normally 90°) before a blank 11 is introduced beneath the collar 19 prior to delivery of a cigarette pack P (and more specifically of that portion of a cigarette pack which includes a block-shaped array of cigarettes and an inner envelope, e.g., an envelope made of tinfoil or the like) into the respective pocket of the turntable. In other words, the introduction of a cigarette pack into a pocket of the turntable follows the conveying of a blank 11 to the required position relative to the collar 19.

For example, the collar 19 can be introduced by a suitable conveyor system 119 at the 6 o'clock position

of the turntable 17 and is held ready in such position while a blank 11 is being advanced (pushed) below the collar. The pocket 18 of the turntable 17 is preferably provided with narrow lateral supporting strips or the like as well as (if necessary) with appropriate lower and/or overhead guides. The collar 19, the blank 11 and the pack P are brought together in the 3 o'clock position of the respective pocket. The blank 11 is pushed or pulled out of the pocket, and a pusher is preferably employed to move the pack upwardly. In addition, one can employ the moving device 27 of Fig. 6 which is delivered from above to engage and to move the pack. Such moving device can further serve to simultaneously expel (push) the blank 11 from its guide 21; the thus expelled blank comes to rest upon a pack P.

As already mentioned hereinbefore, the blanks 11 can serve to bear advertising matter and/or promotional material and/or instructions to the purchasers of the ultimate products (such as hinged lid cigarette packs).

An important advantage of the improved method and apparatus is that the blanks 11 are delivered beneath the collars 19 prior to coming in contact with a pack P, i.e., with a commodity which can include an array of smokers' products and an inner envelope. This has been found to permit for a pronounced reduction of the overall

number of parts in the apparatus as well as for a considerable simplification of the method. Thus, it is not necessary to provide additional gripping, holding and/or transporting means which lift a collar 19 at the assembling station AS preparatory to arrival of a blank 11 at such station. As can be seen in Figs. 1, 2 and 4, the blank 11 at the station AS is located above a pocket 18 of the packing conveyor (folding device) 17. At such time, the blank 11 can be disposed beneath another constituent of the ultimate product. However, it is presently preferred to initially assemble a blank 11 with a collar 19 and to thereupon supply a pack P to a position in which the blank is located (at least in part) between the collar 19 and the pack. The moving device 27 is preferably designed to push (see the arrow 28 in Fig. 6) the blank 11 out of the guide 21 during or prior to delivery of a pack P to the required position relative to the collar 19; at any rate, separation of the blank 11 from the guide 21 is completed before the blank, the associated collar 19 and the associated pack P are advanced to the next processing station where such parts are confined in an outer envelope. The utilization of the moving device 27 contributes to simplicity of the improved apparatus.

The invention can be practiced with equal or simi-

lar advantage in connection with the conveying of blanks from a source other than a magazine and in connection with proper positioning of blanks relative to components other than collars of the type employed in hinged lid packs of cigarettes or the like. All that counts is to ensure that, when the blanks and the components are to be associated with each other at a station analogous to the assembling station AS, the blanks are prevented from descending into an opening corresponding to the pocket 18 of the packing conveyor (folding device) 17. The assembling of discrete blanks with discrete components (such as 19) prior to actual contact of the thus assembled parts with discrete packs P renders it possible to simplify the assembling, to achieve the assembling with a high degree of reproducibility, as well as to simplify and enhance the predictability of the assembly of blanks, components and packs into ultimate products such as hinged lid cigarette packs.

The moving device 27 constitutes an optional but highly desirable feature of the improved apparatus. This device ensures predictable removal of successive blanks 11 from the assembling station AS. In accordance with a presently preferred embodiment, the movements of the device 27 are associated with movements of a pusher which serves to introduce a pack P into the pocket 18. Alter-

natively, the device 27 can be designed in such a way that it engages a pack P while also segregating a blank 11 from the guide 21.

In accordance with a presently preferred embodiment, the moving device 27 or its equivalent is installed for movement in a direction to move successive blanks 11 from the guide 21 and toward successive packs P. If the guide 21 is spaced apart from the collar 19 at the assembling station AS, such guide can constitute a stationary part which is or which can be mounted in such a way that the collar 19 at the station AS is movable upwardly and/or downwardly, especially vertically.

The suction wheel 16 and its suction head(s) 12 constitute presently preferred constituents of the means for conveying successive blanks 11 from the magazine 10 to the assembling station AS. Such conveying is especially predictable if the apparatus further employs the separating device 24 which ensures timely separation of the blank 11 from the suction head(s) on the suction wheel 16. Mechanical separation of blanks 11 from the suction wheel 16 and from its suction head(s) 12 is particularly important when a disconnection of the suction wheel 16 from a suction generating device is not immediately followed by a termination of attraction between the suction head(s) of the suction wheel and the blank 11

which is on its way to the station AS. Since the suction wheel 16 and its suction head(s) 12 are movable between the magazine 10 and the station AS, the separating device 24 can constitute a stationary part.

5 Though it is also possible to design the improved apparatus in such a way that the guide means 26, 21 are located at a level below the pocket 18, it is presently preferred to rely on the solution which is shown in Figs. 1, 2 and 4, i.e., to install such guide means at a level
10 above the pocket 18.

 As utilized in the appended claims, the term "magazine" (10) is intended to embrace a source of supply of accumulated blanks 11 as well as any other suitable means (such as a conveyor for a web or strip and a device
15 for subdividing the running web into a series of discrete blanks) for providing blanks which are to be conveyed to the assembling station AS.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can, by applying current knowledge, readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic and specific aspects of the above outlined contribution to the art of inserting coupons or the like into packs of smokers' products and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the appended claims.